

Better Livelihood through Agroforestry

Agroforestry is an integral part of the rural livelihood systems for centuries in Bangladesh and plays a key role in providing household food and energy security, income and employment generation, investment opportunities and environmental protection. Various traditional and new agroforestry systems are practiced in different ecosystems of Bangladesh. Although agroforestry systems prevail throughout the country, specific agroforestry systems are found in specific ecosystems due to variations in topography, soil, water and climate. However, both traditional and newly introduced agroforestry systems are not practiced scientifically. Therefore, the potential benefits of agroforestry are still remaining untapped. To achieve economic and environmental advantages of agroforestry practices, new systems/practices have been designed and tested for up-scaling the systems/practices in a sustainable and scientific manner. Keeping this in mind, a sub-project entitled "Coordinated Project on Improvement of Agroforestry Practices for Better Livelihood and Environment: BSMRAU Component" was undertaken with the financial support of the PIU-BARC of NATP and is being implemented by the Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur for a duration of two years in Terrace and Coastal ecosystems. Specifically the sub-project is designed to attain:

- Improve the productivity and profitability of agroforestry systems through utilization of improved knowledge and technology.

Approach and Methodology

Benchmark Survey

Sixty respondents from each location were surveyed to know their livelihood, socio-economics and existing agroforestry practices.

Development/Up-Scaling Agroforestry Systems

Terrace ecosystem

At Narsingdi : Multistoried system (Jackfruit at upper storey; Papaya, Lemon, Malta and Orange at middle storey ; seasonal vegetables and Turmeric at lower storey).

At Gazipur : Litchi, Ber and Guava at upper storey and seasonal vegetables at lower storey.

Coastal ecosystem

At Khulna : Mango and Ber at upper storey and Rice and seasonal vegetables at lower storey.

On-Farm Experimentation

On-farm experiments are being conducted for the aforesaid agroforestry systems. In this connection, different management practices for the crops, suitability of the crops/vegetables, varietal selection, orientations and different light levels have been considered for formulating the design of the experiments. Data on fruit tree and crop performance; soil and aerial environment; and socio-economics are being collected.



Multistoried agroforestry system

Achievements

Benchmark information: Agroforestry practice is relatively older in Narsinghdi compared to Kapasia and Paikgachsa. Among different agroforestry systems, Guava based agroforestry systems in Kapasia; Jackfruit based systems in Narsinghdi; and Mango based systems in Paikgacha have been identified as dominant and beneficial, but their management practices were poor.

High incidence of diseases and pests, labour crisis, weed infestation and high production cost were the major problems encountered by the respondents. However, lack of availability of irrigation was also a great bottleneck in Narsinghdi and Kapasia, while salinity was a major constraint in Paikgacha.

Profitability: Based on the benchmark survey, 20 farms have been selected for experimentations. Usually proper management of the field is not done by the farmers, which was responsible for poor crop yields and income. Under this project, some high valued crops are being tested with improved varieties following modern technologies and integrated nutrient and pest management practices. All the participating farmers are highly satisfied with the outputs of both production and income. The profitability of the new systems after one year compared to previous system has been presented in the following Table.

Profitability of new agroforestry system over existing one

Previous system	Net Income (BDT/ha)	New system	Net Income (BDT/ha)	% Higher Income
Narsinghdi				
Jackfruit + Turmeric	38000/-	Jackfruit + Malta + Lemon + Orange + Papaya + Brinjal + Cucumber	145000/-	281.58
Jackfruit + Brinjal	114000/-	Jackfruit + Malta + Lemon + Brinjal	138800/-	21.75
Jackfruit + Aroid	62000/-	Jackfruit + Malta + Lemon + Cucumber	140000/-	125.81
Jackfruit + Bottle gourd	48000/-	Jackfruit + Lemon + Papaya + Brinjal	126000/-	162.50
Sole Jackfruit	47000/-	Jackfruit + Malta + Papaya + Brinjal	121500/-	158.51
Gazipur				
Sole banana	25,000/-	Litchi + Papaya + Indian spinach	85,000/-	220.00
Sole vegetable	10,000/-	Guava + Okra	25,000/-	150.00
Sole vegetable	25,000/-	Litchi + Yard long bean	40,000/-	60.00
Jackfruit + pineapple	30,000/-	Guava + Amaranth	60,000/-	150.00
Khulna				
Mango + T. aman	450000/-	Mango + Vegetable + T. aman	620500/-	37.88
Sole Ber	5,42000/-	Ber + Okra	700000/-	29.15
Sole Ber	3,40000/-	Ber + Mungbean	575000/-	69.10
Jujube + Okra	600000/-	Ber + Okra + Red amaranth	710000/-	18.33
Sole Ber	5,42000/-	Ber + Sponge gourd	705000/-	30.07

Note: The income has been calculated from all the components. Benefit from Malta, Lemon, Litchi, Guava and Orange was not considered as the economic yield has not been obtained yet.



Jackfruit based system (Previous system)

Terrace ecosystem:
Narsinghdi site



Jackfruit based multi-storied system (New system)



Banana field (Previous system)



Litchi + Papaya + Indian Spinach (New system)

Terrace ecosystem: Gazipur site



Sole Ber field (Previous system)



Ber + Mungbean (New system)



Mango + Okra (New system)



Mango + Mungbean (New system)

Coastal ecosystem: Khulna site

Knowledge Management

At first, training was given to the field assistants and research fellows about the objectives of the project, management and production technologies of tree and crop species. Farmers were trained at the beginning of the experimentations on pit preparation; transplanting; weed, fertilizer, irrigation, and disease and pest management; and other aspects of trees and crops. Consultation meetings with farmers were held at field level during the experimentations based on problems raised. Experts from home and abroad visited the fields and provided valuable suggestions to the farmers and researchers.

Lesson Learned

- Although agriculture is the main occupation, but it could not play vital role in income generation due to poor management and lack of suitable crops and technologies.
- Although agroforestry became an alternative important production system and increasingly practiced by many respondents in the study areas, but they were not getting desired yield might be due to low management levels, high infestation of pests and diseases, and lack of good technologies.
- Lack of availability of irrigation was found an acute problem in dry season.
- Farmers training on modern technologies seemed to be effective for increased productivity and income generation of the agroforestry systems.
- Farmers are being getting aware gradually by practicing improved integrated agroforestry systems.

Factors/Way for Up-scaling

- Improving skill and knowledge through training
- Introducing modern technologies and managements
- Ensuring quality planting materials
- Providing technical support by frequent field visit and monitoring



Management practices of new system (irrigation, mulching and IPM)

Success Story

Farmer: Mr. Ataulla Bhuiyan, Belabo, Narsingdi

Mr. Ataulla Bhuiyan is an innovative farmer having a large area of cultivable land. He has 0.38 hectare of land especially where 23 Jackfruit trees are grown sporadically. The ages of the trees varies between 10 and 40 years. He used to grow Brinjal and Turmeric in some pockets of his field with minimum management and never got desired yield. His field was transformed to multistoried system considering Jackfruit trees as upper storey; Papaya, Orange, Lemon and Malta as middle storey; and vegetables and Turmeric as lower storey crops. Last year, his income from Jackfruit trees was BDT 40000 and this year he got BDT 60000 from the same field. His income increased by about 282% with the new multistoried agroforestry systems. He is expecting more income when he could get economic yields from Orange, Lemon and Malta. He is following the advices about integrated nutrient and pest management approaches, which seemed to be effective in getting better production and income. Mr. Bhuiyan has a 7 years old Pummelo tree in his field. He did not get yield from the tree. But huge bearing was found in that tree this year. The tree received no management previously. This year the tree might have enjoyed water and nutrient which were applied for under-storied crops. This could be the reason for unique outcome from Pummelo tree under agroforestry system.



This is a joint publication of the



BSMRAU
Gazipur, Bangladesh



PIU-BARC
Dhaka, Bangladesh



World Agroforestry Centre
ICRAF
Nairobi Kenya



For further details, please contact

Dr. Md. Giashuddin Miah

Professor, Dept. of Agroforestry and Environment, BSMRAU, Gazipur, Bangladesh &
Principal Investigator

Coordinated Project on Improvement of Agroforestry Practices for Better Livelihood and Environment: BSMRAU Component
Tel: +88- 02-9205327; Mobile: +88-017816779614, E-mail: giash1960@gmail.com